

# PSAT Training

## Part 04B

### How to Use PSAT - Import Test Data

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*A U.S. Department of Energy  
Office of Science Laboratory  
Operated by The University of Chicago*

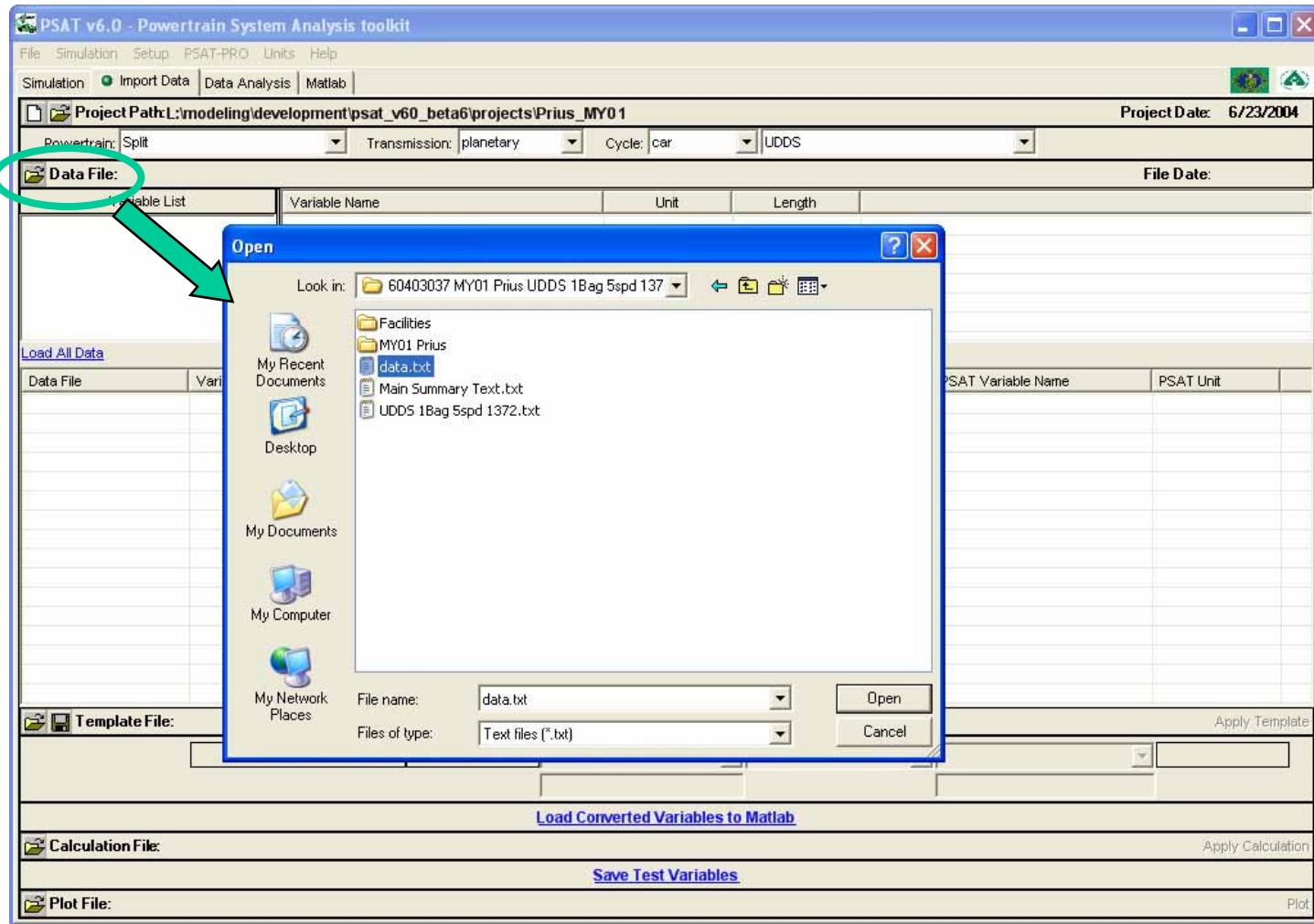


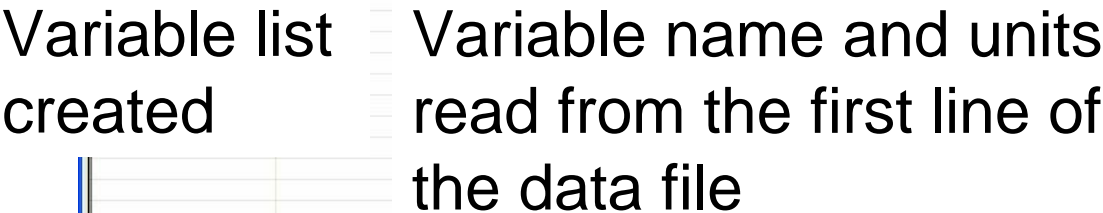
# ***1 – Import Test Data***

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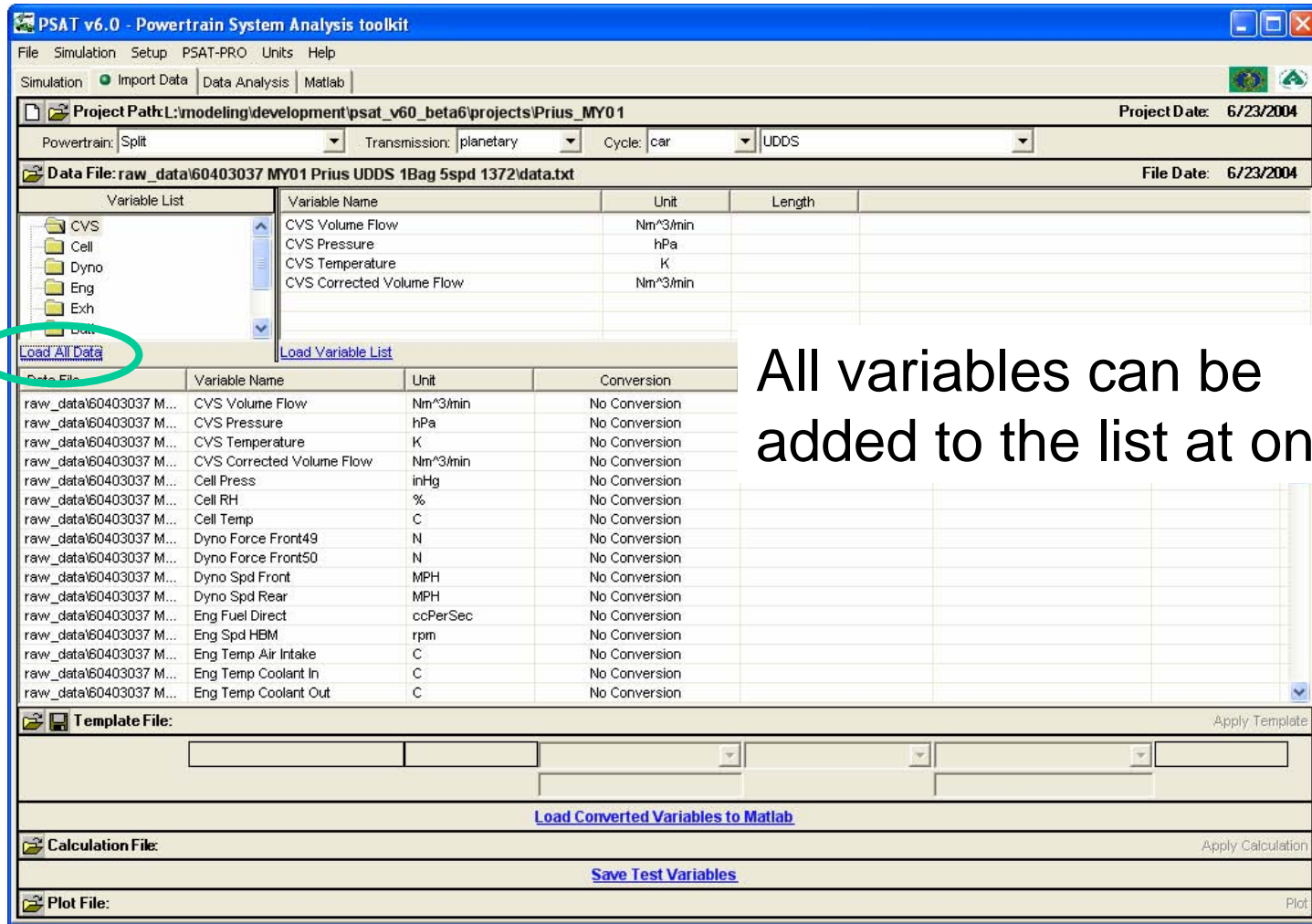
- **Understand the text file structure**
- **Import test data**
- **Post-process data**
- **Plot imported data**

# Load a Data File





# Load All Data



PSAT v6.0 - Powertrain System Analysis toolkit

File Simulation Setup PSAT-PRO Units Help

Simulation Import Data Data Analysis Matlab

Project Path: L:\modeling\development\psat\_v60\_beta6\projects\Prius\_MY01 Project Date: 6/23/2004

Powertrain: Split Transmission: planetary Cycle: car UDDS

Data File: raw\_data\60403037 MY01 Prius UDDS 1Bag 5spd 1372\data.txt File Date: 6/23/2004

Variable List	Variable Name	Unit	Length
CVS	CVS Volume Flow	Nm^3/min	
Cell	CVS Pressure	hPa	
Dyno	CVS Temperature	K	
Eng	CVS Corrected Volume Flow	Nm^3/min	
Exh			
Raw			

[Load All Data](#) [Load Variable List](#)

Data File	Variable Name	Unit	Conversion
raw_data\60403037 M...	CVS Volume Flow	Nm^3/min	No Conversion
raw_data\60403037 M...	CVS Pressure	hPa	No Conversion
raw_data\60403037 M...	CVS Temperature	K	No Conversion
raw_data\60403037 M...	CVS Corrected Volume Flow	Nm^3/min	No Conversion
raw_data\60403037 M...	Cell Press	inHg	No Conversion
raw_data\60403037 M...	Cell RH	%	No Conversion
raw_data\60403037 M...	Cell Temp	C	No Conversion
raw_data\60403037 M...	Dyno Force Front49	N	No Conversion
raw_data\60403037 M...	Dyno Force Front50	N	No Conversion
raw_data\60403037 M...	Dyno Spd Front	MPH	No Conversion
raw_data\60403037 M...	Dyno Spd Rear	MPH	No Conversion
raw_data\60403037 M...	Eng Fuel Direct	ccPerSec	No Conversion
raw_data\60403037 M...	Eng Spd HBM	rpm	No Conversion
raw_data\60403037 M...	Eng Temp Air Intake	C	No Conversion
raw_data\60403037 M...	Eng Temp Coolant In	C	No Conversion
raw_data\60403037 M...	Eng Temp Coolant Out	C	No Conversion

Template File: [Apply Template](#)

[Load Converted Variables to Matlab](#)

Calculation File: [Apply Calculation](#)

[Save Test Variables](#)

Plot File: [Plot](#)

All variables can be added to the list at once

# Rename Variables

The screenshot displays the PSAT v6.0 - Powertrain System Analysis toolkit interface. The top menu bar includes File, Simulation, Setup, PSAT-PRO, Units, and Help. The main window shows project settings for 'Project Path: L:\modeling\development\psat\_v60\_beta6\projects\Prius\_MY01' and 'Project Date: 6/23/2004'. The 'Data File' is 'raw\_data\60403037 MY01 Prius UDDS 1Bag 5spd 1372\data.txt' with a 'File Date: 6/23/2004'. A 'Variable List' table is visible, listing variables like CVS Volume Flow, CVS Pressure, CVS Temperature, and CVS Corrected Volume Flow. Below this, a 'Data File' table shows conversion details for various variables. The 'Engine' component is selected in the 'User Defined Name' dropdown, and the 'eng\_spd\_hbm' variable is highlighted. The 'rad/s' unit is also highlighted. The 'Load Converted Variables to Matlab' button is visible at the bottom.

Data File	Variable Name	Unit	Conversion	PSAT Component
raw_data\60403037 M...	CVS Volume Flow	Nm^3/min	No Conversion	
raw_data\60403037 M...	CVS Pressure	hPa	No Conversion	
raw_data\60403037 M...	CVS Temperature	K	No Conversion	
raw_data\60403037 M...	CVS Corrected Volume Flow	Nm^3/min	No Conversion	
raw_data\60403037 M...	Cell Press	inHg	No Conversion	
raw_data\60403037 M...	Cell RH	%	No Conversion	
raw_data\60403037 M...	Cell Temp	C	No Conversion	
raw_data\60403037 M...	Dyno Force Front49	N	No Conversion	
raw_data\60403037 M...	Dyno Force Front50	N	No Conversion	
raw_data\60403037 M...	Dyno Spd Front	MPH	No Conversion	
raw_data\60403037 M...	Dyno Spd Rear	MPH	No Conversion	
raw_data\60403037 M...	Eng Fuel Direct	ccPerSec	No Conversion	
raw_data\60403037 M...	Eng Spd HBM	rpm	rpm To rad/s	Engine
raw_data\60403037 M...	Eng Temp Air Intake	C	No Conversion	
raw_data\60403037 M...	Eng Temp Coolant In	C	No Conversion	
raw_data\60403037 M...	Eng Temp Coolant Out	C	No Conversion	

1 – Select the component

2 – Define the PSAT name

3 – Automatic conversion occurs by recognizing the PSAT name



# Load Template

PSAT v6.0 - Powertrain System Analysis toolkit

File Simulation Setup PSAT-PRO Units Help

Simulation Import Data Data Analysis Matlab

Project Path: L:\modeling\development\psat\_v60\_beta6\projects\Prius\_MY01 Project Date: 6/23/2004

Powertrain: Split Transmission: planetary Cycle: car UDDS

Data File: raw\_data\60403037 MY01 Prius UDDS 1Bag 5spd 1372\data.txt File Date: 6/23/2004

Variable List	Variable Name	Unit	Length
CVS	CVS Volume Flow	Nm^3/min	
Cell	CVS Pressure	hPa	
Dyno	CVS Temperature	K	
Eng	CVS Corrected Volume Flow	Nm^3/min	
Exh			
Batt			

Load All Data Load Variable List

Data File	Variable Name	Unit	Conversion	PSAT Component	PSAT Variable Name	PSAT Unit
raw_data\60403037 M...	CVS Volume Flow	Nm^3/min	No Conversion	Exhaust Aftertreatment	test_cvs_flow_test	
raw_data\60403037 M...	CVS Pressure	hPa	No Conversion	Exhaust Aftertreatment	test_cvs_press_test	
raw_data\60403037 M...	CVS Temperature	K	K To C	Exhaust Aftertreatment	test_cvs_temp_test	C
raw_data\60403037 M...	CVS Corrected Volume Flow	Nm^3/min	No Conversion	Exhaust Aftertreatment	test_cvs_flow_corr_test	
raw_data\60403037 M...	Cell Press	inHg	kPa To Pa	Vehicle	env_pressure_ambient_test	Pa
raw_data\60403037 M...	Cell RH	%	No Conversion	Vehicle	env_relative_humidity_test	
raw_data\60403037 M...	Cell Temp	C	No Conversion	Vehicle	env_temp_ambient_test	C
				Vehicle		
				Vehicle		
				Vehicle		
				Vehicle		
				Engine		
				Engine		
raw_data\60403037 M...	Eng Spd	rpm	rpm To rad/s	Engine	eng_spd_out_test	rad/s
raw_data\60403037 M...	Eng Temp Intake	C	No Conversion	Engine	eng_temp_air_in_test	C
raw_data\60403037 M...	Eng Temp Coolant In	C	No Conversion	Engine	eng_temp_coolant_in_test	C
raw_data\60403037 M...	Eng Temp Coolant Out	C	No Conversion	Engine	eng_temp_coolant_out_test	C

Template File: prius\_MY01\_template.tpl

Apply Template

Load Converted Variables to Matlab

Calculation File: Apply Calculation

Save Test Variables

Plot File: Plot

1 – Template loaded

2 – Apply template

# Load Variables to MATLAB

All the test variables from sensors end by “\_test”

PSAT v6.0 - Powertrain System Analysis toolkit

Project Date: 6/23/2004

UDDS

File Date: 6/23/2004

Length

CVS Volume Flow Nm<sup>3</sup>/min

CVS Pressure hPa

CVS Temperature K

CVS Corrected Volume Flow Nm<sup>3</sup>/min

Your variables are:

eng\_ch4\_concentration\_test

eng\_co2\_concentration\_test

eng\_colow\_concentration\_test

eng\_conid\_concentration\_test

eng\_fuel\_rate\_test

eng\_nox\_concentration\_test

eng\_spd\_out\_test

eng\_temp\_air\_in\_test

eng\_temp\_coolant\_in\_test

eng\_temp\_coolant\_out\_test

eng\_temp\_oil\_test

eng\_thc\_concentration\_test

eng\_trq\_out\_test

env\_dilute\_air\_relative\_humidity\_test

env\_pressure\_ambient\_test

env\_relative\_humidity\_test

env\_temp\_ambient\_test

ess\_curr\_out\_test

ess\_soc\_test

ess\_volt\_out\_test

essacc\_volt\_in\_test

ex\_hc\_post\_cat\_concentration\_test

ex\_hc\_pre\_cat\_concentration\_test

ex\_temp\_post\_cat\_test

ex\_temp\_post\_trap\_test

ex\_temp\_pre\_cat\_test

mc2\_curr\_in\_test

mc\_curr\_in\_test

mc\_inverter\_temp\_coolant\_in\_test

mc\_inverter\_temp\_coolant\_out\_test

pchighvolt\_curr\_in\_test

test\_bag\_num\_test

test\_cvs\_flow\_corr\_test

test\_cvs\_flow\_test

test\_cvs\_press\_test

test\_cvs\_temp\_test

time\_test

veh\_acc\_pedal\_post\_test

veh\_force\_brake\_pedal\_test

veh\_force\_dyno\_target\_test

veh\_force\_in\_test

veh\_lin\_spd\_out\_test

veh\_spd\_dyno\_rear\_test

wh\_brake\_pressure\_cyl\_test

wh\_brake\_pressure\_pedal\_test

wh\_spd\_in\_test

Template File: prius\_MY01\_template.tpl

Apply Template

Load Converted Variables to Matlab

Calculation File:

Apply Calculation

Save Test Variables

Plot File:

Plot



## ***2 – Post-process Data***

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- **Create calculation file**
- **Load predefined calculations**

# Load Predefined Calculations

PSAT v6.0 - Powertrain System Analysis toolkit

File Simulation Setup PSAT-PRO Units Help

Simulation Import Data Data Analysis Matlab

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Exh			
Batt			

Load All Data Load Variable List

Data File	Variable Name	Unit	Conversion	PSAT Component	PSAT Variable Name	PSAT Unit
raw_data\60403037 M...	CVS Volume Flow	Nm^3/min	No Conversion	Exhaust Aftertreatment	test_cvs_flow_test	
raw_data\60403037 M...	CVS Pressure	hPa	No Conversion	Exhaust Aftertreatment	test_cvs_press_test	
raw_data\60403037 M...	CVS Temperature	K	K To C	Exhaust Aftertreatment	test_cvs_temp_test	C
raw_data\60403037 M...	CVS Corrected Volume Flow	Nm^3/min	No Conversion	Exhaust Aftertreatment	test_cvs_flow_corr_test	
raw_data\60403037 M...	Cell Press	inHg	kPa To Pa	Vehicle	env_pressure_ambient_test	Pa
raw_data\60403037 M...	Cell RH	%	No Conversion	Vehicle	env_relative_humidity_test	
raw_data\60403037 M...	Cell Temp	C	No Conversion	Vehicle	env_temp_ambient_test	C
raw_data\60403037 M...	Dyno Force Front49	N	No Conversion	Vehicle	veh_force_dyno_target_test	N
raw_data\60403037 M...					veh_force_in_test	N
raw_data\60403037 M...					veh_lin_spd_out_test	m/s
raw_data\60403037 M...					veh_spd_dyno_rear_test	m/s
raw_data\60403037 M...					eng_fuel_rate_test	
raw_data\60403037 M...	Eng Spd rpm	rpm	rpm to rad/s	Engine	eng_spd_out_test	rad/s
raw_data\60403037 M...	Eng Temp Air Intake	C	No Conversion	Engine	eng_temp_air_in_test	C
raw_data\60403037 M...	Eng Temp Coolant In	C	No Conversion	Engine		
raw_data\60403037 M...	Eng Temp Coolant Out	C	No Conversion	Engine		

Template File: prius\_MY01\_template.tpl

Calculation File: L:\modeling\development\psat\_v60\_beta6\projects\Prius\_MY01\Prius\_MY01\_predefined\_calculations.m

Plot File:

1 – Calculation loaded

2 – Apply calculation

Load Converted Variables to Matlab

Save Test Variables

Apply Calculation

# 3 – *Plot Imported Data*

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- **Create plot file**
- **Load predefined plots**

# Load Predefined Plots

